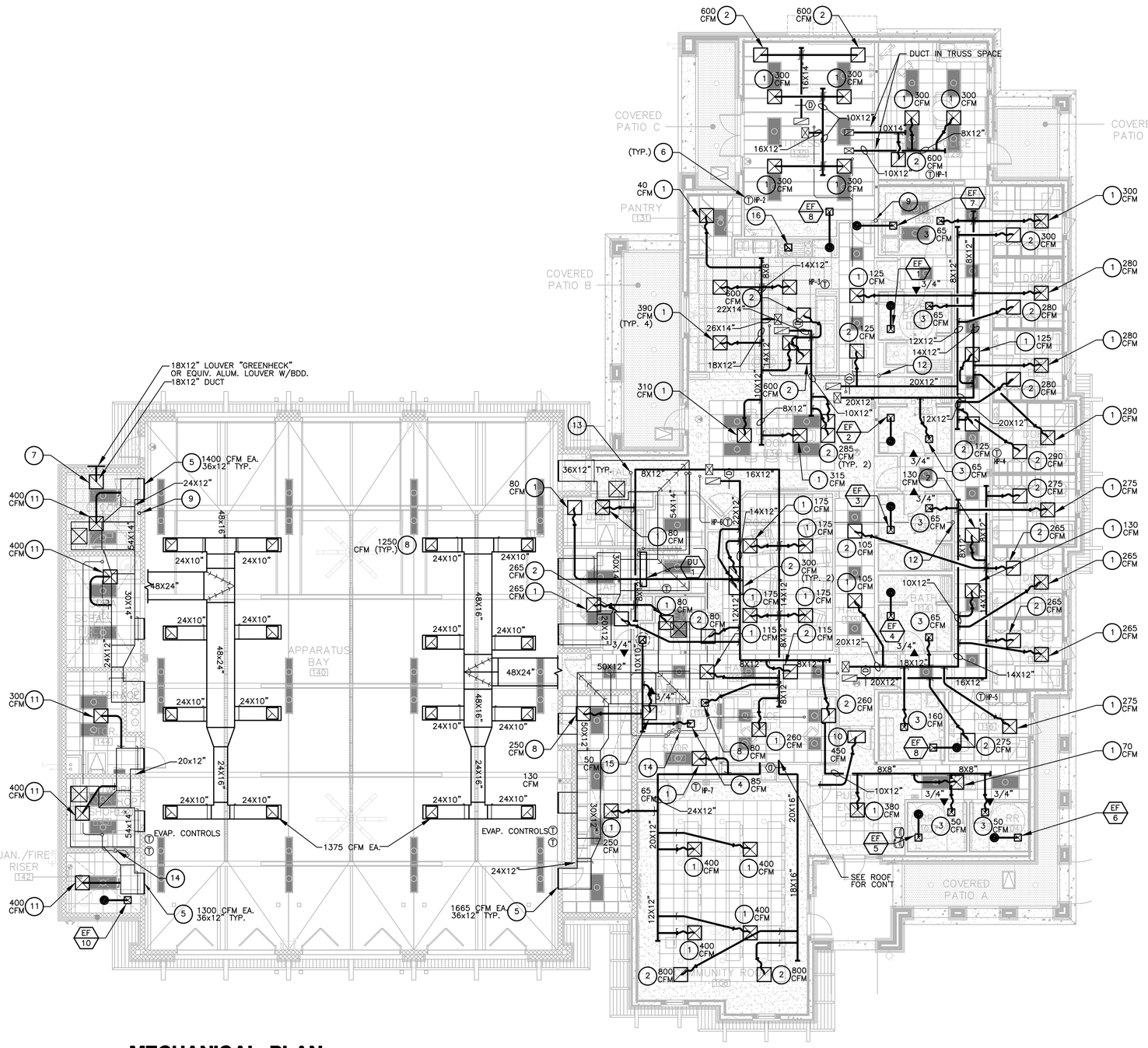

1 MECHANICAL PLAN

SCALE: 1/8" = 1'-0"

N

(#) KEYED NOTES:

1. CEILING DIFFUSER CD-1 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
2. RETURN GRILLE RG-1 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
3. CEILING DIFFUSER CD-2 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
4. EXHAUST GRILLE EG-1 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
5. SUPPLY GRILLE SG-1 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
6. EMS SENSOR MOUNTED AT 48" AFF TO TOP CONTROL. SENSOR SHALL BE "ALERTON" (NO SUBSTITUTIONS) PROVIDED AND INSTALLED BY THE CONTROLS CONTRACTOR. GENERAL CONTRACTOR SHALL INCLUDE CONTROLS CONTRACTOR PRICE FOR COMPLETE SYSTEM.
7. RELIEF GRILLE RG-2 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
8. EXHAUST GRILLE EG-2 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
9. DRYER VENT FULL SIZE OF DRYER OUTLET OUT TO FACTORY DRYER VENT BOX AND DUCT UP TO DRYER VENT CAP.
10. 30x20" RETURN GRILLE AT CFM SHOWN. "TITUS" 350L. SURFACE MOUNT. WITH FULL SIZE RA PLENUM.
11. CEILING DIFFUSER CD-3 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
12. 3/4" CONDENSATE LINE DOWN IN WALL TO LAVATORY TAIL PIECE.
13. 3/4" EVAP.DRAIN LINE OVER TO MOP SINK.
14. 3/4" CONDENSATE AND/OR 3/4" EVAP. DRAIN DOWN IN WALL TO ELBOW DOWN AND OUT OVER MOP/FLOOR SINK. TERMINATE WITH 2" AIR GAP.
15. EXHAUST GRILLE EG-3 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
16. EXHAUST DUCT UP TO EF ON ROOF.

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Registered Professional Engineer (Mechanical) CERTIFICATE NO. 32366 GEORGE J. JOSEPHS Date Signed 6/4/2019 ARIZONA, U.S.A.

Rev	Date	By	Description
1	7-17-19	-	CITY COMMENTS

City of Buckeye
Fire Station No. 705
30551 W. Tartesso Pkwy.
Buckeye, AZ 85396

1ST SUBMITTAL

Drawn/Checked By
/ GJJ

Date
07-17-19

Project Number
318009

Sheet Number
MECHANICAL PLAN
M2.1

AME PROJECT # 19-017
AME CONSULTING ENGINEERS MECHANICAL PLUMBING
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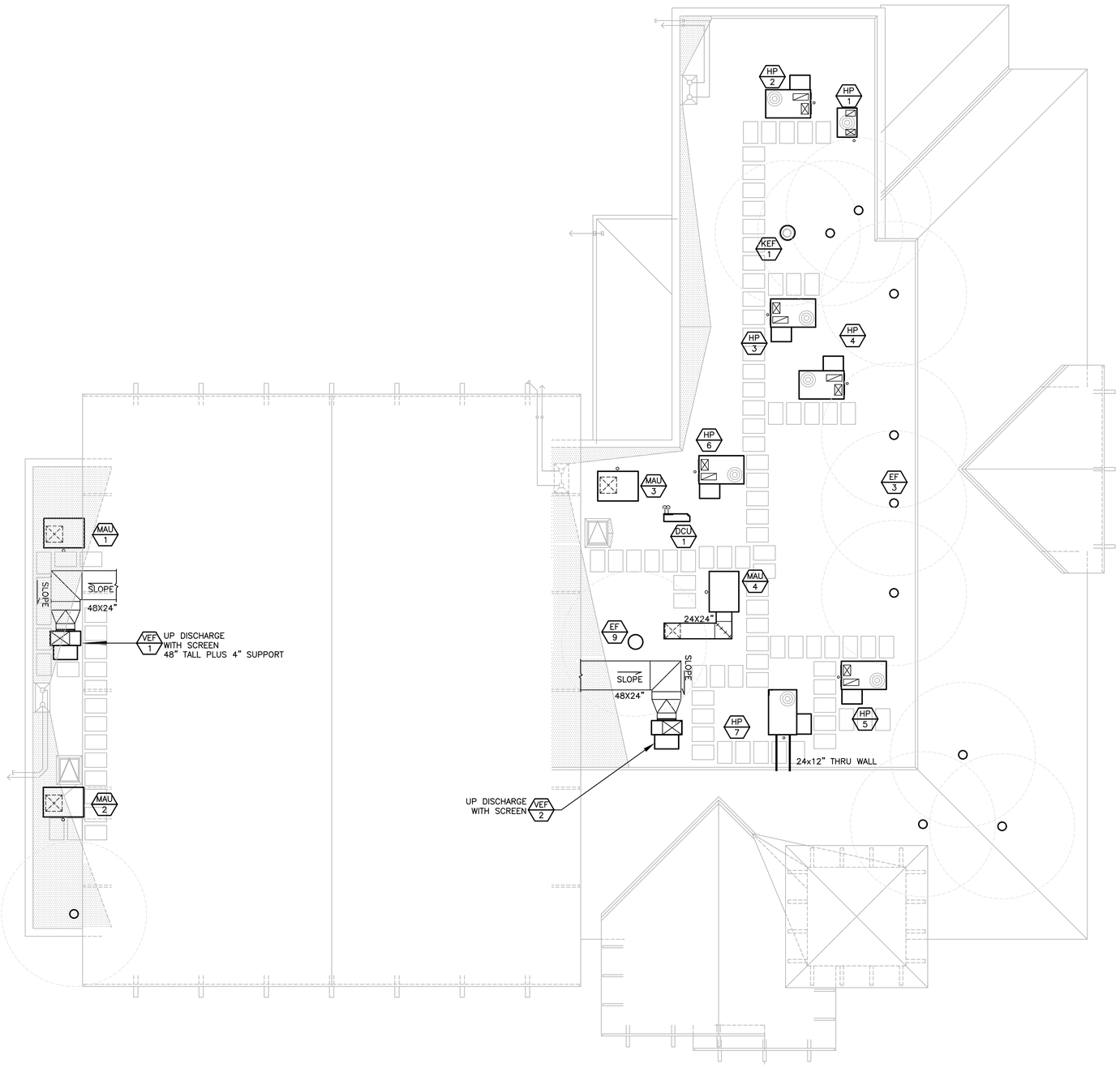

1 MECHANICAL ROOF PLAN

SCALE: 1/8" = 1'-0"

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Registered Professional Engineer (Mechanical)
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JOSEPHS
Date Signed
6/4/2019
ARIZONA, U.S.A.

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MECHANICAL ROOF PLAN

M2.2

AME PROJECT # 19-017

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PACKAGED ROOF MOUNTED HEAT PUMP UNIT SCHEDULE (AIR-TO-AIR) R-410a

TAG HP #	MANUFACTURER	MODEL	AIR CAPACITIES: TOTAL CFM	OA CFM	ESP IWG	BLOWER HP	EER (SEER) / COP (HSPF)	CYCLE	EVAPORATOR ENTERING: DB	WB	AMBIENT CONDITION: DB	WB	COOLING/HEATING CAPACITIES (MBH): SENSIBLE	TOTAL	MAIN UNIT ELECTRICAL BASE CHARACTERISTICS: MCA	COMP. RLA	ODF FLA	IDF FLA	MOCP	VOLT	PH	UNIT WEIGHT	REMARKS
1	CARRIER	48VR-C24 (2t)	855	*	.5	1/2	12.0 (15.0)/ (8.2)	COOL	80	67	115	71	–	22.8	19.3	11.7 x1	0.6 x1	4.1	30	208/230	1	362	1 3 4 5 6
								HEAT	70	–	32	–	–	23.4									

1. NO SMOKE DETECTOR REQUIRED. UNIT 2000 CFM OR LESS AND NO SHARED AIR SYSTEM
2. NOT USED.
3. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR.
4. VERIFY EXACT LOCATION WITH STRUCTURAL. PROVIDE AND INSTALL MANUFACTURER'S ROOF CURB, MINIMUM OF 8" TALL. PROVIDE/INSTALL WITH MANUFACTURER'S RECOMMENDED PROGRAMMABLE THERMOSTAT WITH BATTERY BACKUP.
5. PROVIDE WITH MINIMUM 35% EFFICIENT FILTERS "FARR" OR EQUIVALENT; ONE SET FOR CONSTRUCTION AND BALANCING, ONE CLEAN SET PRIOR TO TURNOVER.
6. UNITS EXCEED MINIMUM EFFICIENCY REQUIREMENTS PER 2012 IECC BY MORE THAN 10% THEREFORE NO ECONOMIZERS REQUIRED.

* REFER TO OUTSIDE AIR CALCULATIONS FOR REQUIRED VENTILATION AIR SETTINGS.

PACKAGED ROOF MOUNTED HEAT PUMP UNIT SCHEDULE (AIR-TO-AIR) R-410a

TAG HP #	MANUFACTURER	MODEL	AIR CAPACITIES: TOTAL CFM	OA CFM	ESP IWG	BLOWER HP	EER (SEER) / COP (HSPF)	CYCLE	EVAPORATOR ENTERING: DB	WB	AMBIENT CONDITION: DB	WB	COOLING/HEATING CAPACITIES (MBH): SENSIBLE	TOTAL	MAIN UNIT ELECTRICAL BASE CHARACTERISTICS: MCA	COMP. RLA	ODF FLA	IDF FLA	MOCP	VOLT	PH	UNIT WEIGHT	REMARKS
2	CARRIER	50HCQ004 (3t)	1200	*	.5	1.5 (MED MTR) BELT & DRIVE	12.7 (15.6)/ (8.0)	COOL	80	67	115	71	25.4	31.8	19.2	10.4 x1	1.0 x1	5.2	25	208/230	3	645	1 2 3 4 5 6
								HEAT	70	–	32	–	–	22.8									
3	CARRIER	50HCQ005 (4t)	1600	*	.5	1.5 (MED MTR) BELT & DRIVE	12.8 (15.8)/ (8.1)	COOL	80	67	115	71	32.5	41.6	23.0	13.1 x1	1.4 x1	5.2	30	208/230	3	730	1 2 3 4 5 6
								HEAT	70	–	32	–	–	35.85									
4	CARRIER	50HCQ005 (4t)	1600	*	.5	1.5 (MED MTR) BELT & DRIVE	12.8 (15.8)/ (8.1)	COOL	80	67	115	71	32.5	41.6	23.0	13.1 x1	1.4 x1	5.2	30	208/230	3	730	1 2 3 4 5 6
								HEAT	70	–	32	–	–	35.85									
5	CARRIER	50HCQ005 (4t)	1600	*	.5	1.5 (MED MTR) BELT & DRIVE	12.8 (15.8)/ (8.1)	COOL	80	67	115	71	32.5	41.6	23.0	13.1 x1	1.4 x1	5.2	30	208/230	3	730	1 2 3 4 5 6
								HEAT	70	–	32	–	–	35.85									
6	CARRIER	50HCQ005 (4t)	1600	*	.5	1.5 (MED MTR) BELT & DRIVE	12.8 (15.8)/ (8.1)	COOL	80	67	115	71	32.5	41.6	23.0	13.1 x1	1.4 x1	5.2	30	208/230	3	730	1 2 3 4 5 6
								HEAT	70	–	32	–	–	35.85									
7	CARRIER	50HCQ007 (6t)	2400	*	.5	2.9 (MED MTR) BELT & DRIVE	12.0 / 2.4L 3.4H	COOL	80	67	115	71	47.7	62.4	34.3	19.0 x1	1.5 x2	7.5	50	208/230	3	860	1 2 3 4 5 6
								HEAT	70	–	32	–	–	54.35									

1. MECHANICAL CONTRACTOR SHALL INSTALL NEW 120V DUCT MOUNTED SMOKE DETECTOR IN RETURN DUCT (DETECTOR PROVIDED BY FIRE ALARM CONTRACTOR, CONNECTED TO FA BY FA CONTRACTOR). FIRE ALARM CONTRACTOR SHALL PROVIDE AND INSTALL REMOTE LED INDICATOR/TEST STATION MOUNTED IN CEILING DIRECTLY BELOW UNIT. DETECTOR SHALL BE WIRED TO SHUT DOWN ALL UNITS SERVING THIS TENANTS SPACE. DETECTOR SHALL ACTIVATE A VISIBLE AND AUDIBLE SUPERVISORY SIGNAL AT A CONSTANTLY ATTENDED LOCATION. DETECTOR AND INDICATOR SHALL BE INSTALLED BY MECHANICAL, WIRED BY ELECTRICAL.
2. SMOKE DETECTORS ASSOCIATED WITH SMOKE DAMPERS AND HVAC SHUTOFFS SHALL BE TESTED BY AN APPROVED TESTING AGENCY OR A QUALIFIED THIRD PARTY SPECIAL INSPECTOR. THE SPECIAL INSPECTOR/TESTING AGENCY SHALL BE AN INDEPENDENT THIRD PARTY INDIVIDUAL OR FIRM AND SHALL NOT BE THE INSTALLING CONTRACTOR. A PROFESSIONAL ENGINEER MUST SUBMIT A FINAL SIGNED AND SEALED REPORT TO THE MECHANICAL INSPECTOR PRIOR TO CITY ISSUANCE OF FINAL INSPECTION APPROVAL OR OCCUPIED APPROVAL, INCLUDING CONDITIONAL OCCUPANCY APPROVAL.
3. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR.
4. VERIFY EXACT LOCATION WITH STRUCTURAL. PROVIDE AND INSTALL MANUFACTURER'S ROOF CURB, MINIMUM OF 8" TALL. PROVIDE/INSTALL WITH MANUFACTURER'S RECOMMENDED PROGRAMMABLE THERMOSTAT WITH BATTERY BACKUP.
5. PROVIDE WITH MINIMUM 35% EFFICIENT FILTERS "FARR" OR EQUIVALENT; ONE SET FOR CONSTRUCTION AND BALANCING, ONE CLEAN SET PRIOR TO TURNOVER.
6. UNITS EXCEED MINIMUM EFFICIENCY REQUIREMENTS PER 2012 IECC BY MORE THAN 10% THEREFORE NO ECONOMIZERS REQUIRED.

* REFER TO OUTSIDE AIR CALCULATIONS FOR REQUIRED VENTILATION AIR SETTINGS.

DUCTLESS SPLIT SYSTEM COOLING ONLY UNIT SCHEDULE (AIR-TO-AIR) R-410A

TAG DU #	TAG DCU #	MANUFACTURER	MODEL INDOOR/ OUTDOOR	AIR CAPACITIES: TOTAL CFM	OA CFM	ESP IWG	IDF WATTS	SEER RATING	CYCLE	EVAPORATOR ENTERING: DB	WB	AMBIENT CONDITION: DB	WB	COOLING/HEATING CAPACITIES (MBH): SENSIBLE	TOTAL	ELECTRICAL CHARACTERISTICS: MCA	COMPRESSOR RLA / LRA	ODF FLA	IDF FLA	MOCP	VOLT	PH	UNIT WT	REMARKS
1	1	MITISUBISHI MR SLIM INVERTER	PKA-A36FA	990 (HIGH SPEED)	PROCESS	DUCTLESS	70	13.1	COOLING	80	67	95	75	27,360	34,200	1			.52	INDOOR RECEIVE POWER FROM OUTDOOR			62	1 2 3 4 5 6 7
			PUY-A36NHA						HEATING							25	12 / 17.5	.75		40	208-230	1	163	

1. NO ALLOWANCE SHALL BE MADE FOR CONTRACTORS FAILURE TO COORDINATE WITH ALL TRADES PRIOR TO ANY WORK INCLUDING BUT NOT LIMITED TO STRUCTURAL AND ELECTRICAL AND ARCHITECTURAL.
2. CONDENSING UNITS SHALL BE SECURED TO PLATFORM TO PREVENT MOVEMENT CAUSED DAMAGE TO REFRIGERANT PIPING.
3. ALL REFRIGERATION PIPING SHALL BE SIZED PER MANUFACTURER'S REQUIREMENTS AND INCLUDE ALL REQUIRED ACCESSORIES.
4. THIS UNIT RECEIVES ITS POWER FROM THE OUTDOOR UNIT THROUGH A FIELD SUPPLIED INTERCONNECTING WIRE; CONDUIT BY ELECTRICAL, LOW VOLTAGE BY MECHANICAL, LINE VOLTAGE WIRING BY ELECTRICAL.
5. THIS UNIT IS FOR PROCESS COOLING OF EQUIPMENTT 24 HOURS A DAY. PROVIDE AND INSTALL ALL MANUFACTURER RECOMMENDED ACCESSORIES INCLUDING BUT NOT LIMITED TO LOW AMBIENT CONTROLS.
3. PROVIDE AND INSTALL MATCHING INTEGRAL / INTERNAL CONDENSATE PUMP.
4. PROVIDE AND INSTALL REMOTE DIGITAL THERMOSTAT. MOUNT THERMOSTAT AT ADA HEIGHT.
5. NOT USED.
6. ALL CONTROL WIRING SHALL BE IN CONDUIT.
7. PROVIDE MANUFACTURERS MATCHING LINE-HIDE SET COVER SYSTEM WHERE REFRIGERANT PIPING CANNOT BE CONCEALED WITHIN WALL.

CENTRIFUGAL VEHICLE EXHAUST FAN SCHEDULE (UTILITY SET)

TAG VEF #	MANUFACTURER	MODEL	AIR CAPACITIES: TOTAL CFM	TSP IWG	BLOWER HP	ELECTRICAL CHARACTERISTICS: MOCP	VOLT	PH	UNIT WT	REMARKS
1,2	GREENHECK	SWB-222	11,000	1.0	7.5	–	208	3	450	1 2 3 4

1. PROVIDE AND INSTALL WITH GRAVITY BACKDRAFT DAMPER.
2. PROVIDE AND INSTALL VIBRATION ISOLATION-SPRING ISOLATOR SIZED PER FAN MANUFACTURER'S RECOMMENDATIONS.
3. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR.
4. SINGLE SPEED. REFER TO INTERLOCKING SCHEDULE, THIS SHEET.

CENTRIFUGAL EXHAUST FAN SCHEDULE (CEILING FAN)

TAG EF #	MANUFACTURER	MODEL	AIR CAPACITIES: TOTAL CFM	TSP IWG	BLOWER HP	ELECTRICAL CHARACTERISTICS: AMPS	VOLT	PH	UNIT WT	REMARKS
1-7,10	BROAN	L100	95	0.25	FRACT.	0.7	120	1	10	1 2 3 4 1.3 SONES
8	BROAN	L200	200	0.25	FRACT.	1.8	120	1	23.1	1 2 3 4 2.3 SONES

1. PROVIDE AND INSTALL WITH GRAVITY BACKDRAFT DAMPER.
2. PROVIDE AND INSTALL VIBRATION ISOLATION PER MANUFACTURER'S RECOMMENDATIONS.
3. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR.
4. THIS FAN SHALL BE CONTROLLED BY A WALL SWITCH.

CENTRIFUGAL EXHAUST FAN SCHEDULE (DOME FAN, DIRECT DRIVE)

TAG EF #	MANUFACTURER	MODEL	AIR CAPACITIES: TOTAL CFM	TSP IWG	BLOWER HP	ELECTRICAL CHARACTERISTICS: MOCP	VOLT	PH	UNIT WT	REMARKS
9	GREENHECK	G-090-VG	557	.375	1/6	–	120	1	22	1 2 3 4

1. PROVIDE AND INSTALL WITH GRAVITY BACKDRAFT DAMPER.
2. PROVIDE AND INSTALL VIBRATION ISOLATION INCLUDING 1/2" NEOPRENE PAD AT CURB.
3. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR.
4. 24/7 OPERATION. PROVIDE AND INSTALL SPEED CONTROLS.

EVAPORATIVE COOLER SCHEDULE

TAG MAU #	MANUFACTURER	MODEL	AIR CAPACITIES: TOTAL CFM	TSP IWG	BLOWER HP	ELECTRICAL CHARACTERISTICS: AMPS	VOLT	PH	UNIT WT	REMARKS
1-4	CHAMPION	SA-150B	5000	.6	1.5	6.6	208	3	680	1 2 3 W/110467 PUMP (1 AMP, 115V)

1. REFER TO PLANS FOR DUCTING. 1-3 DOWN DISCHARGE, 4 SIDE DISCHARGE . ALL WITH SINGLE SPEED MOTORS. REFER TO INTERLOCKING NOTES, THIS SHEET.
2. PROVIDE AND INSTALL VIBRATION ISOLATION MINIMUM OF 1" NEOPRENE PAD.
3. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR. PUMP REQUIRES SEPARATE CIRCUIT.

INTERLOCKING AND CONTROLS NOTES:

VEF-1 SHALL BE INTERLOCKED WITH MAU-1 AND MAU-2 SO THAT THE FOLLOWING SEQUENCE OF OPERATION IS PROVIDED:

VEF-1 SHALL OPERATE FOR 5 MINUTES AFTER ACTIVATION FROM DOOR SENSOR. 10000 CFM (10 AIR XCHG PER HOUR).

MAU-1 AND MAU-2 SHALL OPERATE BASED ON DEMAND FROM THERMOSTATIC CONTROLS OR MANUAL OVERRIDE. COOLING SHALL BE PER ON-AUTO CONTROL SWITCH. WHEN MAU-1/MAU-2 (BOTH WILL OPERATE AT THE SAME TIME) ARE IN OPERATION, VEF-1 SHALL OPERATE (FOR POWER RELIEF). WHEN VEF-1 OPERATES, MAU-1/MAU-2 SHALL OPERATE (FOR MAKEUP AIR).

IF DOOR REMAINS OPEN, VEF MAY BE TURNED OFF AFTER 5 MINUTES REGARDLESS OF MAU OPERATION (FOR ENERGY SAVINGS).

VEF-2 SHALL BE INTERLOCKED WITH MAU-3 AND MAU-4 SHALL FOLLOW THE SAME SEQUENCE.

CONNECT TO DOOR MOTOR OPERATOR POSITION SWITCH FOR DOOR SIGNALS.
(ONE PER DOOR) TO COMMUNICATE AND INTERLOCK THIS SEQUENCE WITH THE "CLIMATEC" CONTROL SYSTEM.

CENTRIFUGAL ROOF UPBLAST FAN (FOR TYPE II HOOD)

TAG KEF #	MANUFACTURER	MODEL	AIR CAPACITIES: TOTAL CFM	TSP IWG	BLOWER HP	ELECTRICAL CHARACTERISTICS: MOCP	VOLT	PH	UNIT WT	REMARKS
1	GREENHECK	CUBE-101	1200	.6	1/3	–	120	1	58	1 2 3

1. TYPE II HEAT REMOVAL ONLY.
2. STANDARD TYPE II DUCTWORK (NON WELDED).
3. INTERLOCK TO HOOD SWITCH. NO GREASE CUP REQUIRED, NO HINGED BASE REQUIRED.

FLEX DUCT SIZING CHART

	CFM RANGE			
	0-199	200-399	400-599	600-799
FLEX DIA	8"ø	10"ø	12"ø	14"ø

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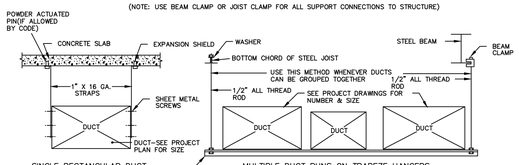
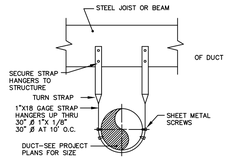
(NOTE: USE BEAM CLAMP OR JOIST CLAMP FOR ALL SUPPORT CONNECTIONS TO STRUCTURE)



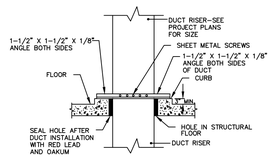
SINGLE RECTANGULAR DUCT

MULTIPLE DUCT RUNS ON TRAPEZE HANGERS

NOTE: DUCTS SHALL BE SUPPORTED AT NOT LESS THAN 10 FT. O.C.



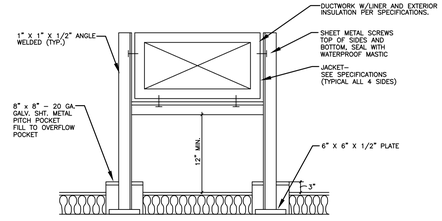
ROUND DUCT



RISER SUPPORT

2 | SCALE NTS | HANGER AND SUPPORT FOR LOW PRESSURE DUCTWORK UP THRU 2" WG

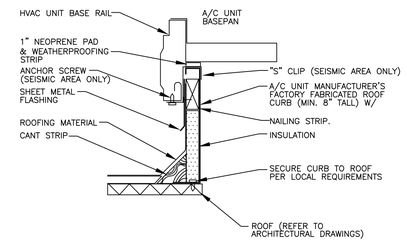
NOTES:
1. REFER TO SPECIFICATION SECTION 15000 FOR LINER, JACKET, AND INSULATION TYPES AND THICKNESSES.
2. INSTALLATION SHALL MEET SMACNA STANDARDS, UMC REQUIREMENTS WITH LOCAL CODE AMENDMENTS, AND SEISMIC REQUIREMENTS.
3. REFER TO ARCHITECTURAL PLANS FOR ROOFING AND STRUCTURE TYPE.



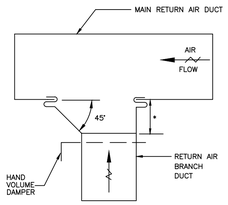
ROOF, ROOFING, AND STRUCTURE PER ARCHITECTURAL AND STRUCTURAL PLANS.

1 | SCALE NTS | DUCT SUPPORT ON ROOF DETAIL

NOTES:
1. CURB INSERT AND SHIM SHALL BE WOOD WHEN APPLIED TO BUILDINGS OF COMBUSTIBLE CONSTRUCTION ONLY. CURB INSERT AND SHIM SHALL BE OF NON-COMBUSTIBLE MATERIAL WHEN APPLIED TO BUILDINGS OF NON-COMBUSTIBLE CONSTRUCTION.
2. REFER TO ARCHITECTURAL PLANS AND SPECIFICATIONS FOR ROOFING TYPE.
3. PROVIDE SEISMIC RESTRAINTS WHEN REQUIRED BY LOCAL CODES.
4. PROVIDE AND INSTALL WITH SLOPED ROOF ADAPTOR AND SHIMS AS REQUIRED.

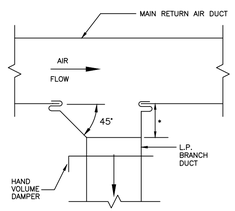


6 | SCALE NTS | EQUIPMENT MOUNTING CURB DETAIL



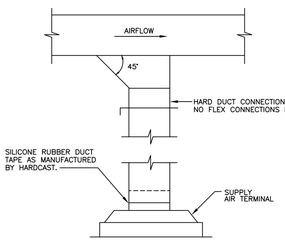
*-EQUALS WIDTH OF BRANCH DUCT UP TO 12". 12" FOR ALL BRANCH DUCTS LARGER THAN 12".

5 | SCALE NTS | RETURN AIR BRANCH DUCT TAKE-OFF



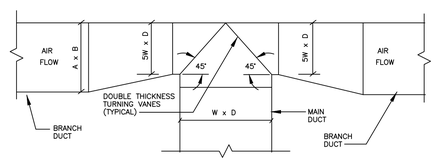
*-EQUALS WIDTH OF BRANCH DUCT UP TO 12". 12" FOR ALL BRANCH DUCTS LARGER THAN 12".

4 | SCALE NTS | SUPPLY AIR BRANCH DUCT TAKE-OFF

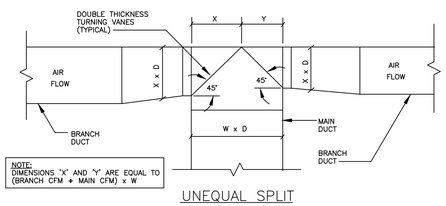


*ONLY WHERE INDICATED ON PLANS.

3 | SCALE NTS | RIGID CONNECTION DUCT BRANCH TAKE-OFF



EQUAL SPLIT

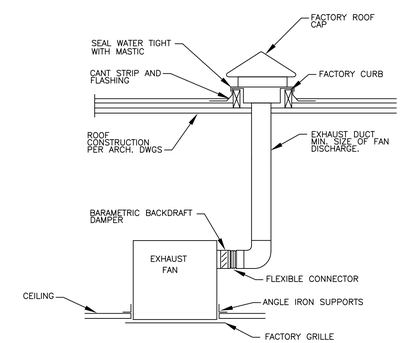


NOTE:
DIMENSIONS 'X' AND 'Y' ARE EQUAL TO (BRANCH CFM ÷ MAIN CFM) x W

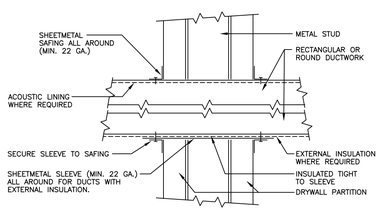
UNEQUAL SPLIT

10 | SCALE NTS | DUCT TEE CONNECTION DETAIL

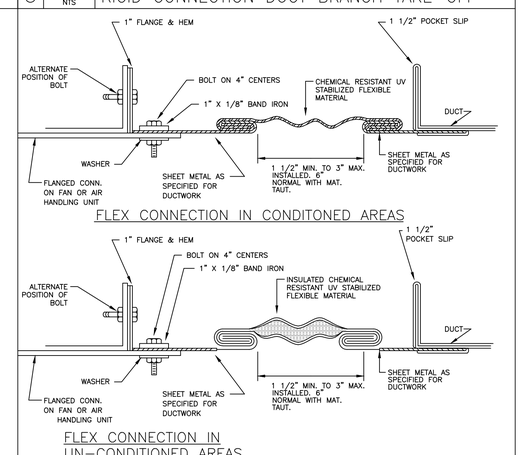
NOTES:
1. APPLY MASTIC PER SPECIFICATIONS TO SEAL WATER TIGHT.
2. USE FACTORY SUPPLIED GRILLE UNLESS NOTED OTHERWISE.
3. THIS INSTALLATION IS NOT ALLOWED IN BUILDINGS WITH RETURN AIR PLENUM.



9 | SCALE NTS | CEILING MOUNTED EXHAUST FAN



8 | SCALE NTS | DUCT PENETRATION THRU NON-FIRE RATED WALL



7 | SCALE NTS | DUCT FLEX CONNECTION DETAIL

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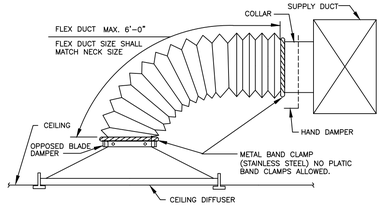
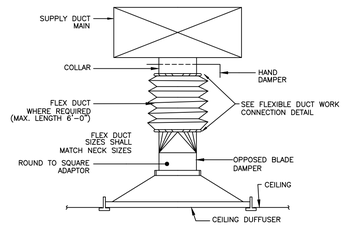


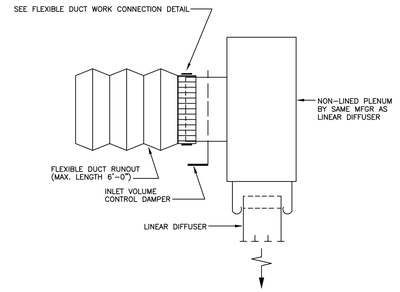
(SIDE OF DUCT CONNECTION–USE ONLY WHERE NOT LABELED AS "RIGID CONNECTION ONLY")

4 | SCALE NTS | TYPICAL DIFFUSER CONNECTION

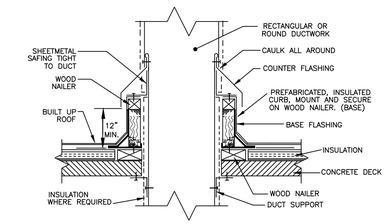


(BOTTOM OF DUCT CONNECTION–USE ONLY WHERE NOT LABELED AS "RIGID CONNECTION ONLY")

3 | SCALE NTS | TYPICAL DIFFUSER CONNECTION



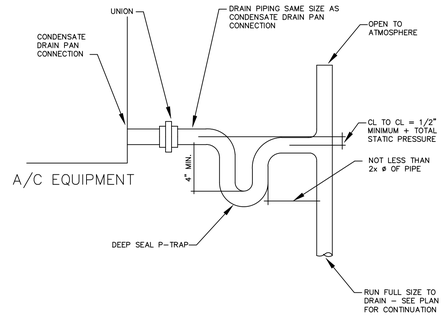
2 | SCALE NTS | LINEAR DIFFUSER CONNECTION



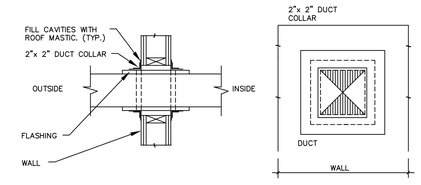
USE THIS DETAIL FOR EVAPORATIVE COOLER DUCT THROUGH ROOF.

1 | SCALE NTS | DUCT THRU ROOF

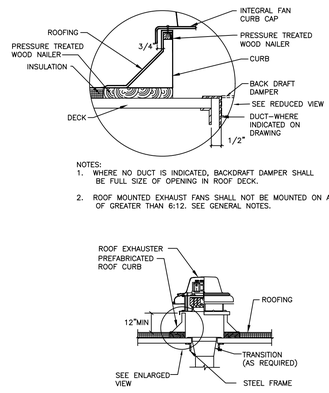
NOTES:
1. DRAIN LINE SIZE SHALL NOT BE LESS THAN CONNECTION SIZE AT UNIT.
2. THIS DETAIL APPLIES TO DRAW–THROUGH CONFIGURATION ONLY.
3. FOR BLOW–THROUGH CONFIGURATION, TRAP DEPTH SHALL BE 1/2" PLUS TOTAL STATIC PRESSURE OF A/C UNIT.



8 | SCALE NTS | CONDENSATE DRAIN DETAIL



7 | SCALE NTS | DUCT THROUGH WALL

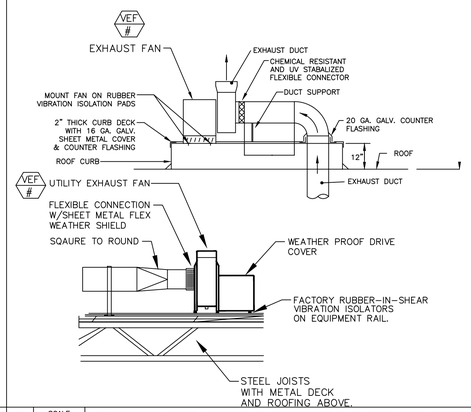


NOTES:
1. WHERE NO DUCT IS INDICATED, BACKDRAFT DAMPER SHALL BE FULL SIZE OF OPENING IN ROOF DECK.
2. ROOF MOUNTED EXHAUST FANS SHALL NOT BE MOUNTED ON A SLOPE OF GREATER THAN 6:12. SEE GENERAL NOTES.

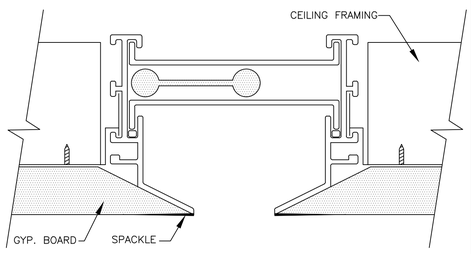
6 | SCALE NTS | ROOF MOUNTED EXHAUST FAN DETAIL

GENERAL DETAIL ONLY. REFER TO PLANS FOR DUCTING.

REFER TO DUCT THROUGH WALL DETAIL FOR EXHAUST DUCT THROUGH HORIZONTAL WALL SURFACE.

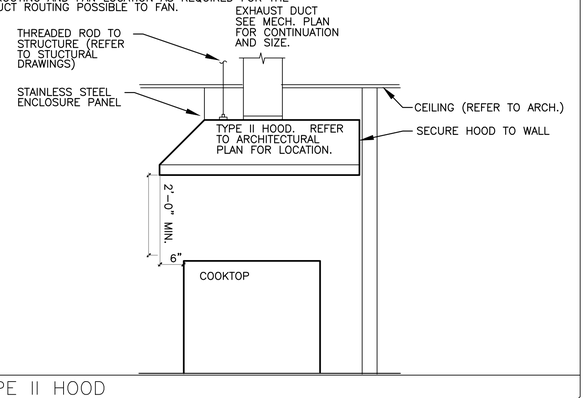


5 | SCALE NTS | APPARATUS BAY EXHAUST FAN DETAIL



9 | SCALE NTS | LINEAR DIFFUSER MOUNTING

NOTES:
1. REFER TO ARCHITECTURAL SPECIFICATIONS FOR HOOD INFORMATION.
2. COORDINATE WITH FOOD SERVICE CONTRACTOR FOR LOCATION, EXHAUST AIRFLOW RATE, AND DUCT COLLAR LOCATIONS AND SIZES.
3. ADJUST DUCT ROUTING AND FAN LOCATION AS REQUIRED FOR THE STRAIGHTEST DUCT ROUTING POSSIBLE TO FAN.



9 | SCALE NTS | TYPE II HOOD

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AME PROJECT # 19-017

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HVAC SYMBOLS AND ABBREVIATIONS

SINGLE LINE	DOUBLE LINE	DESCRIPTION	ABBR.
		NEW RECTANGULAR DUCTWORK (SUPPLY, RETURN, EXHAUST, RELIEF) REFER TO PLANS FOR SIZE	–
		TRANSITION	–
		NEW ROUND OR OVAL DUCTWORK (SUPPLY, RETURN, EXHAUST, RELIEF) REFER TO PLANS FOR SIZE	–
		EXISTING DUCTWORK	–
		45 DEG. TAP AT BRANCH DUCTS	–
		DUCT SPLIT WITH DAMPER: USE AT ELBOWS, TEES, AND WHERE INDICTATED PER SMACNA (LATEST EDITION)	–
		CURVED ELBOW-MINIMUM RADIUS R: 1.5 WIDTH PER SMACNA (LATEST EDITION)	–
		90 DEG. ELBOW WITH SINGLE RADIUS TURNING VANES (RADIUS HEEL ALLOWED FOR DUCT 12X12" AND SMALLER)	–
		FLEXIBLE DUCT CONNECTION	FLEX
		VOLUME DAMPER WITH LOCKING QUADRANT	VD
		SPIN-IN FLEX DUCT TAKE-OFF WITH VOLUME DAMPER	–
		SPLITTER DAMPER WITH LOCKING QUADRANT	S&Q
		SUPPLY AIR	SA
		EXHAUST AIR	EXH
		RETURN AIR	RA
		RELIEF AIR	REL
		OUTSIDE AIR	OSA
		CONNECTION OF NEW WORK TO EXISTING	P.O.C.
–	–	TRANSFER AIR	TA
–	–	EXHAUST REGISTER	ER
–	–	ABOVE FINISHED FLOOR	AFF
–	–	BELOW FINISHED FLOOR	BFF
–	–	NOT TO SCALE	NTS
S	S	SENSOR	S
T	T	THERMOSTAT	T
		FIRE DAMPER	FD
		COMBINATION FIRE AND SMOKE DAMPER	CFSD
D	D	DUCT MOUNTED SMOKE DETECTOR	SD
F	F	FIRE STAT (REFER TO SPECIFICATIONS FOR TEMP)	–
O	O	OUTSIDE AIR TEMPERATURE SENSOR	–
W/G SIZE	W/G SIZE	DOOR UNDERCUT (WITH SIZE)	–
(E)	(E)	EXISTING	–
(R)	(R)	RELOCATED	–
BDD	BDD	BACK DRAFT DAMPER (ARROW DENOTES DIRECTION OF AIR FLOW)	BDD

HVAC ABBREVIATIONS

ABBREVIATION	DESCRIPTION
CD	CEILING DIFFUSER
RG	RETURN GRILLE
EG	EXHAUST GRILLE
SD	SUPPLY DIFFUSER
TG	TRANSFER GRILLE
BDD	BACK DRAFT DAMPER
AFF	ABOVE FINISHED FLOOR
BFF	BELOW FINISHED FLOOR
WG	WAVE GUIDE VENT (RF SHEILDING)
MP	MEDIUM PRESSURE
OSA	OUT SIDE AIR
EF	EXHAUST FAN
AHU	AIR HANDLING UNIT
FCU	FAN COIL UNIT
WSHP	WATER SOURCE HEAT PUMP
CU	CONDENSING UNIT
HP	HEAT PUMP (PACKAGED)
LD	LINEAR DIFFUSER
OBD	OPPOSED BLADE DAMPER

AIR DEVICE SCHEDULE

DEVICE SYMBOL	DESCRIPTION	MANUFACTURER	MODEL	DEVICE SIZE	NECK SIZING CFM RANGE	NECK SIZING NECK SIZE	COLOR	MATERIAL	DAMPER	NC MAX	FRAME TYPE	NOTES
	CEILING DIFFUSER CD-1	TITUS	OMNI	24x24"	0-199	8"ø	WHITE	STEEL	OBD	30	–	–PROVIDE AND INSTALL WITH GYP. OR LAY-IN FRAME TO MATCH CEILING TYPE OF INTENDED LOCATION. USE RAPID MOUNT FRAME FOR ACCESS TO DUCT BALANCING DAMPER WHERE LOCATED IN GYP.
					200-399	10"ø						
					400-599	12"ø						
					600-899	14"ø						
	CD-3	TITUS	OMNI-A	24x24"			WHITE	ALUM	OBD	30		–ALL ALUMINUM WHERE CONNECTED TO EVAPORATIVED COOLED SYSTEMS.
	CEILING DIFFUSER CD-2	TITUS	MCD	12x12"	0-200	8"ø	WHITE	STEEL	OBD	30	GYP.	–
					201-400	10"ø						
					401-600	12"ø						
					601-900	14"ø						
	SUPPLY GRILLE SG-1	TITUS	300FL	REFER TO PLANS			–	ALUM				–PROVIDE AND INSTALL WITH WITH 30° DEFLECTION DOWN. –ALL ALUMINUM WHERE CONNECTED TO EVAPORATIVE COOLED SYSTEMS.
	EXHAUST GRILLE EG-3	TITUS	PAR	24x24"	0-199	8"ø	WHITE	STEEL	–	30	–	–PROVIDE AND INSTALL WITH GYP. OR LAY-IN FRAME TO MATCH CEILING TYPE OF INTENDED LOCATION. USE RAPID MOUNT FRAME FOR ACCESS TO DUCT BALANCING DAMPER WHERE LOCATED IN GYP.
					200-399	10"ø						
					400-500	12"ø						
					600-900	14"ø						
	RETURN GRILLE RG-1	TITUS	EGGCRATE	24x24"	0-199	8"ø	WHITE	ALUM	–	30	GYP. OR LAY-IN	–PROVIDE AND INSTALL WITH GYP. OR LAY-IN FRAME TO MATCH CEILING TYPE OF INTENDED LOCATION. USE RAPID MOUNT FRAME FOR ACCESS TO DUCT BALANCING DAMPER WHERE LOCATED IN GYP.
					200-399	10"ø						
					400-500	12"ø						
					600-900	14"ø						
	RELIEF GRILLE RG-2	TITUS	EGGCRATE	24X24"	0-199	8"ø	WHITE	ALUM	–	30	GYP. OR LAY-IN	–PROVIDE AND INSTALL WITH GYP. OR LAY-IN FRAME TO MATCH CEILING TYPE OF INTENDED LOCATION.
					200-399	10"ø						
					400-500	12"ø						
					600-900	14"ø						
	EXHAUST GRILLE EG-2	TITUS	EGGCRATE	24x24"	0-199	8"ø	ALUM	ALUM.	–	30	–	–MOUNTED TO UNDERSIDE OF DUCT WITH ENOUGH NECK FOR BALANCING DAMPER OR PROVIDE/INSTALL AIR SCOOP WITH DAMPER INSIDE EXHAUST DUCT.
					200-399	10"ø						
					400-500	12"ø						
					600-900	14"ø						
	EXHAUST GRILLE EG-1	TITUS	MCD	12x12"	0-199	8"ø	WHITE	STEEL	OBD	30	GYP.	–
					200-399	10"ø						
					–	–						
					–	–						

PROVIDE AND INSTALL A COMPLETE ENERGY MANAGEMENT SYSTEM FOR CONTROL OF THE AIR CONDITIONING AND APPARATUS BAY SYSTEMS IN THE BUILDING. THE SYSTEM SHALL BE "ALERTON" (NO SUBSTITUTIONS) PROVIDED AND INSTALLED BY THE CONTROLS CONTRACTOR. THE GENERAL CONTRACTOR SHALL INCLUDE ALL COSTS FOR THE CONTROLS CONTRACTOR IN HIS BID. THE SYSTEM SHALL INCLUDE A BUILDING LEVEL CONTROLLER, SENSORS, WORKSTATION (OR OWNER DESIGNATED WORKSTATION) FOR ANY SYSTEM SOFTWARE, CONTROLLERS, WIRING AND PROGRAMMING. THE BID SHALL INCLUDE ALL REQUIREMENTS FOR REMOTE ACCESS AND 40 MAN-HOURS OF TRAINING FOR THE OWNER. THE CONTROLS CONTRACTOR SHALL INCLUDE A MINIMUM OF 40 HOURS OF ON-SITE TIME FOR COMMISSIONING AND TEST AND BALANCE ASSISTANCE.

OSA VENTILATION CALCULATION

ZONE	OCCUPANCY CATEGORY (PEOPLE/FT.^{2})	TOTAL AREA (FT.^{2})	OCCUPANCY DENSITY (PEOPLE/FT.^{2})	ZONE POPULATION (PZ)	OSA REQ.'D PER PERSON (CFM)	OSA REQ.'D PER SQ.FT. (CFM)	BREATHING ZONE OSA (VBZ)(CFM)	ZONE AIR DISTRIBUTION EFFECTIVENESS (EZ)	ZONE OUTDOOR AIR FLOW (VOZ)(CFM)	ZONE PRIMARY AIR FLOW (VPZ)(CFM)	PRIMARY OUTDOOR AIR FRACTION (ZP=VOZ/VPC)	SYSTEM VENTILATION EFFICIENCY (EV)	OCCUPANT DIVERSITY FACTOR (D)	UNCORRECTED OUTDOOR AIR INTAKE (VOU)	TOTAL OSA REQUIRED PER ASHRAE 62.1 (VOT)(CFM)	TOTAL OSA PROVIDED (CFM)
HP-1	FITNESS ROOM	500	10/1000	5	20	0.06	130	0.8	162	1000	0.162	0.9	1.0	130	144	162
HP-2	OFFICE	313	5/1000	2	5	0.06	29	0.8	36	600	0.06	1	1.0	29	29	36
HP-3	CORRIDOR	203	–	–	–	0.06	12	0.8	15	125	0.12					
	STORAGE	61	–	–	–	0.12	7	0.8	9	75	0.12					
	DINING	236	70/1000	17	7.55	0.18	170	0.8	212	500	0.424	0.7	1.0	189	270	236
HP-4	CORRIDOR	455	–	–	–	0.06	27	0.8	34	250	0.136					
	STORAGE	104	–	–	–	0.12	12	0.8	15	65	0.2308					
	SLEEP ROOM	418	10/1000	5	25	–	125	0.8	156	1150	0.1357	0.9	1.0	164	182	205
HP-5	CORRIDOR	446	–	–	–	0.06	27	0.8	34	235	0.1447					
	EXAM ROOM	95	10/1000	1	25	–	25	0.8	31	160	0.1938					
	SLEEP ROOM	431	10/1000	5	25	–	125	0.8	156	1080	0.1444	0.9	1.0	177	197	205
HP-6	OFFICE	314	5/1000	2	5	0.06	29	0.8	36	525	0.0686					
	CONFERENCE	372	50/1000	19	5	0.06	117	0.8	146	655	0.2229					
	CORRIDOR	178	–	–	–	0.06	11	0.8	14	115	0.1217	0.9	1.0	183	203	228
	STORAGE	216	–	–	–	0.12	26	0.8	32	320	0.1					
HP-7	LOBBY	202	10/1000	3	5	0.06	27	0.8	34	600	0.0567					
	CONFERENCE	784	50/1000	40	5	0.06	247	0.8	309	1210	0.2554					
	CORRIDOR	88	–	–	–	0.06	5	0.8	6	150	0.04	0.8	1.0	371	464	464
	STORAGE	70	–	–	–	0.12	8	0.8	10	65	0.1538					
	ACCESSORY TO ASSEMBLY	277	30/1000	9	7.5	0.06	84	0.8	105	800	0.1312					

NOTE: VENTILATION SHALL BE BALANCED BY AN APPROVED METHOD. A BALANCE REPORT SHALL VERIFY THAT THE VENTILATION SYSTEM IS CAPABLE OF SUPPLYING THE AIRFLOW RATES REQUIRED BY 2012 IMC SECTION 403. SAID REPORT MUST BE PRESENTED TO THE ADMINISTRATIVE AUTHORITY.

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